4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter presents anticipated environmental impacts for each of the build alternatives retained for further study, allowing comparison to the status-quo baseline of the No-build Alternative. Resources identified in Chapter 3 for which no impacts are anticipated are not included in this Chapter. These resources are: Soils and Geology, Vegetation and Cover Type, Tidal Wetland Areas, Coastal Zone, Navigation, Prime and Unique Farmland, Environmental Justice, Public Parks and Recreation Lands and above-ground Historic Resources. Where appropriate, recommendations regarding abatement and/or mitigation measures are provided. A summary of these measures and a list of project commitments is provided at the end of the chapter.

4.2 PHYSICAL AND BIOLOGICAL ENVIRONMENT

4.2.1 Groundwater

Construction of any alternative would have some impact on the surrounding water quality and quantity. Potential impacts include:

- Minor changes in groundwater recharge patterns could occur from the increased impervious area (highway surface) and alterations to existing surface water drainage systems. In some areas, more or less precipitation may reach the underlying aquifer, resulting in changes in the amount and quality of available groundwater. Blasting performed during construction may also alter bedrock groundwater flow patterns in the immediate vicinity of the blasts. It is likely that recharge and flow pattern impacts will be localized, minor, and unnoticeable in area private or public water wells.

- Increased road salt contamination may occur in some areas surrounding the constructed highway alternative. Although road salt is used on the existing roads in developed areas, the additional paved area requiring snow and ice control and the new drainage systems associated with the constructed alternative may increase and/or change the distribution of dissolved salt within the three types of aquifers identified. Because of the physical properties of dissolved salt and the low attenuation capacities of crystalline bedrock, the aquifers that are most susceptible to road salt contamination are the fractured bedrock aquifers with thin soil cover. Areas within the study with this type of aquifer are most commonly found on the rolling hill tops on the west side of the river, along Route 201/100.

- There is a potential for contamination of groundwater resulting from traffic accidents. Traffic accidents often release chemicals such as motor fuels, coolants, and lubricating oils. These are usually in small quantities of less than 20 gallons (80 liters). Also, motorized freight carriers will likely transport a variety of chemicals that could be released in the event of an accident. Both the sand and gravel aquifers and the fractured bedrock aquifers are very susceptive to accidental releases of motor fuel or other chemicals from highway accidents. Table 4-1 includes a tabulation of the area of sand and gravel aquifers intersected by each alternative. The sand and gravel aquifers are limited to the western side of the river.

Changes in groundwater quality and quantity have the greatest potential consequences in areas that are serviced by individual private water wells or include the source water protection areas for public wells. None of the alternatives studied encroached on source water protection areas, as defined by the Maine Department of Human Services - Division of Health Engineering. However, Alternative B intersects within the 250-foot radius source water protection area for a non-community public water supply. This is a drilled well at the One-Seven-Ten Sport complex on Route 202/3.

The Augusta Water District does not serve any of the developed areas in Alternatives A or B west of the Kennebec River. The District also does not serve the portion of Route 202/3 intersected by Alternatives A-1 and A-2. Business and residences in these areas rely primarily on private dug and drilled wells.

MDOT has a well claim process to investigate and mitigate damages to well water quality or quantity resulting from MDOT activities.

Table 4-1. Groundwater Resources Impacted by the Alternatives

Alternative	Significant Sand and Gravel Aquifers*: acres (hectares)	Public Water Wells**: (#)
A-1	2.9 (1.2)	0
A-2	1.3 (0.5)	0
B	3.8 (1.5)	1 (business)

*Significant Sand and Gravel Aquifers as mapped by the Maine Department of Conservation, Maine Geological Survey.

4.2.2 Surface Waters

Water Resource Indicators

Water resource evaluation of the alternatives has been done by using indicators which are an indirect measurement of impacts to water resources. This evaluation used four indicators to determine short-term and long-term environmental impact potential. The four indicators do not necessarily deserve equal weight in considering the environmental impact potential of each alternative as the affected water resources have different sensitivities to the indicators. The indicators are:

- **Amount of New Impervious Area**: Predicted amount of new impervious area from the project.
- **Predicted number of new stream crossings**: Predicted number of DEP stream crossings that will occur as a result of the project not including the crossing of the Kennebec River. Separate totals are given for the east and west side of the Kennebec River.
- **Linear Feet of Road that is predicted to be within 500 ft (150 m) of DEP stream**: Predicted amount of new road that will be adjacent [within 500 ft (150 m)] to a named DEP stream and/or the Kennebec River.
- **Linear Feet of Road that is predicted to be within 500 ft (150 m) of steep slopes:** Predicted amount of new road that will be adjacent, 500 ft (150 m), to slopes that are consistently greater than 10% in gradient.

  Note: The indicators were measured using base maps titled "Surface Waters & Drainage" at a scale of 1:200'.

Predicted Surface Water Impacts

Table 4-2 presents the predicted impacts for each of the alternatives and the connectors based on the indicators defined above. Impacts are discussed below.

Alternative A-1 -- This alternative has the largest amount of new impervious area. Fisher Brook and Riggs Brook will be impacted by increased quantities of stormwater and changes in the timings of concentrations in the subdrainage areas. Alternative A-1 crosses and is adjacent to the headwaters of Fisher Brook. Headwater streams are generally more impacted by unmitigated stormwater than downstream segments. The entire portion of steep slopes for this alternative drains to the Kennebec River, which is less sensitive than Fisher Brook and Riggs Brook to increased storm water quantities because the ratio of stormwater flow to river flow is significantly less. This alternative has less of a direct potential for sedimentation than the others.

Table 4-2. Indicators of Potential Surface Water Impacts

Alternative	Amount of New Impervious Area ft² (m²)	Linear Feet (meters) of Road w/in 500 ft (150 m) of Steep Areas	Predicted DEP Stream Crossings	Linear Feet (meters) of Road w/in 500 ft (150 m) of Streams
A-1	910,000 (84,585)	250 (76)	East Side--2 West Side-- 3	5,200 (1,585)
A-2	881,000 (81,890)	250 (76)	East Side--2 West Side-- 3	4,400 (1,341)
B	772,000 (71,758)	1,600 (488)	East Side--4 West Side--6	9,400 (2,866)
Connector A	194,000 (18,032)	0	0	1,400 (427)
Connector B	401,000 (37,273)	0	1	1,000 (305)

Alternative A-2 -- This alternative has the second largest amount of new impervious area and also has a lower risk of sedimentation than A-1. As with Alternative A-1, this alternative will impact Fisher Brook and Riggs Brook. See discussion of impacts from stormwater quantity increases and steep slopes in Alternative A-1 above.

Alternative B -- This alternative has the least amount of new impervious area. However, it has six times the amount of new road adjacent to or on steep slopes in comparison to the Alternative A options. Most of the area of steep slopes drain directly to Fisher Brook, increasing the erosion potential. Steep slopes for this alternative are located from approximately 1600 feet (500 m) west of the Kennebec River to the riverbanks.

This alternative more directly impacts Fisher Brook than the A alternatives, increasing the potential for direct sedimentation events during construction and over time. On the east side, Alternative B has the lowest direct sedimentation potential as measured by stream crossings and length of adjacent road compared to the Alternative A options.

Connector A -- This connector involves upgrading an existing city street. The overall increase in impervious area will impact minor drainage areas, although to a lesser extent than with new construction. This connector crosses no known DEP streams. The connector is not located in areas of steep slopes and the direct impacts to water resources are minimal.

Connector B -- This connector will have twice the amount of new impervious area in comparison to Connector A , but in combination with Alternative B it would be similar to the A-alternatives combined with Connector A. Connector B does involve one known DEP stream crossing and 1000 feet (300 meters) of adjacent road which indicates a higher potential for

direct sedimentation than Connector A. There are no known areas of steep slopes along this proposed connector.

Prevention and Mitigation of Impacts to Surface Waters

All alternatives will be constructed in compliance with the MDOT Best Management Practices for Erosion and Sediment Control, Sept. 1997 (BMP manual). In compliance with the BMP manual, all new alignments will be designated as located in a sensitive water resource watershed so the most stringent level of temporary erosion and sediment control will be required in the construction contract. This means that contract requirements such as covering disturbed soils at the end of each work day will apply to all the alternatives. Specific temporary best management measures will be added to the contract during the design phase.

All the proposed alternatives fall under the MDOT and DEP Memorandum of Agreement on Stormwater due to the amount of new impervious area. Long-term stability of ditches and slopes will be included in the design of the selected alternative. Stormwater quantity will be analyzed for the selected alternative and post-development peak flows will be kept to pre-development levels to the greatest extent possible. Stormwater flows and time of concentration will be evaluated to ensure that no long-term erosion problems are created in drainage swales or streams associated with the selected alternative.

The probability of success for the mitigation measures is quite high when typical measures such as vegetative stabilization can be used. The steep slopes on Alternatives A and B will allow for stabilization of slopes and ditches with vegetation.

Any stream that must be realigned due to the project shall be done so that a natural stream bottom is preferred over a stone ditch lining. All tributary and named streams shall be avoided whenever possible. DOT shall try to maintain a vegetated buffer between the project and any stream to the best extent possible. It is preferred to leave existing vegetation rather than to plant a buffer. All of these shall be considered in the design process.

Specific mitigative measures for each alternative are detailed in the *Augusta River Crossing Study Water Resource Evaluation of Alternatives* (Noel 1999).

4.2.3 Wildlife

Mammals

Impacts to mammals will result from fragmentation and loss of habitat blocks (Table 4-3). Habitat fragmentation and loss will reduce the amount of carrying capacity (amount of avail-

able habitat for individual animals) of the area, potentially lowering populations of some mammal species. Also, bisecting habitats with a road may increase animal/vehicle collisions and increase mortality rates of some species.

Table 4-3. Predicted Areas of Habitat Types Impacted in Acres (hectares)*
(Based on 150-foot wide area of impact)

Cover Type	Alternative A-1	Alternative A-2	Alternative B
Open Field- Hay	27.4 (11.1)	25.8 (10.4)	25.5 (10.3)
Open Field- Crop	12.4 (5.0)	3.5 (1.4)	0
Soft Wood	11.8 (4.8)	16.5 (6.7)	0
Mixed Wood	2.5 (1.0)	0.6 (0.2)	6.9 (2.8)
Hard Wood	5.5 (2.2)	6.9 (2.8)	2.2 (0.9)
Hard Wood Scrub	0	0	11.8 (4.8)
Shrub Wetland	1.8 (0.7)	2.9 (1.2)	1.4 (0.6)
Developed*	5.5 (2.2)	9.8 (4.0)	11.0 (4.5)
Total	**66.9 (27.1)**	**66.1 (26.7)**	**58.3 (23.6)**

*Includes residential areas and 3.3 acres of recently disturbed area along Alternative B

For all alternatives, fill for the Interstate 95 entrance and exit ramps will directly affect approximately 14 acres (5.7 hectares) of open field. The ramps will encircle another 9 acres (3.6 hectares) on the west side, and fill about 3 acres (1.2 hectares) on the east side. Alternatives A-1 and A-2 abut an 8 acre (3.2 hectare) open field/shrub complex and a 14-acre (5.7 hectare) softwood block between Eight Rod Road and Route 104. These alignments also affect about 3 acres (1.2 hectare) of hardwood/mixed wood habitat adjacent to the river that serve as cover habitat for river dependent species such as raccoon and mink. On the east side of the river, Alternative A-1 crosses the northerly third of both an 18-acre (7.3 hectare) hayed field and a 250-acre (100 hectare) softwood block, affecting roughly 8 acres (3.2 hectare) of each. Alternative A-2 traverses the southerly third of an open field and bisects a softwood block, affecting approximately 3 acres (1.2 hectares) and 8.5 acres (3.4 hectares) respectively.

Alternative B affects less softwood habitat, but affects 11 acres (4.5 hectares) of hardwood and scrub hardwood habitat adjacent to both the Kennebec River and Fisher Brook. These areas are habitat for water dependent species such as mink, otter, and raccoon.

Birds

It is expected that impacts to birds will be primarily from a reduction in nesting and foraging habitat within the forested areas. Birds that prefer the forest interior as habitat will be affected by the fragmentation of the large softwood block on the east side. Recent logging activity has already reduced this area's value as interior habitat.

Woodcock -- Woodcock use open fields for courtship and scrub-shrub area such as alder stands for nesting. Impacts to both of these covertypes will occur regardless of which alternative is selected; however, none of the alignments are expected to adversely impact the woodcock population.

Waterfowl -- Waterfowl and wading bird use is found on the Kennebec River, along the river shore, and along Riggs Brook. These waterbodies will be spanned by all alternatives under consideration, and no impacts from the project are expected. Any changes in waterfowl habitat that may occur from the removal of the Edwards Dam are not expected to be compounded by this project.

4.2.4 Aquatic Habitat

Fisheries

Potential impacts to fisheries in the Kennebec River and streams affected by the alternatives would come primarily from sedimentation during construction activities and/or winter sanding efforts. In addition, water temperature in the streams may be affected by the removal of shade-providing vegetation. Both A alternatives will directly affect tributaries of Stone Brook and Fisher Brook on the west side of the Kennebec River and Riggs Brook on the east side. Alternative A-2 would affect an additional tributary of Riggs Brook. Riggs Brook is a warm water fishery and temperature is not expected to be affected by the project. Minimizing clearing at the crossings should reduce any potential for thermal impacts to the streams.

Alternative B also will directly affect tributaries of Stone Brook and Fisher Brook on the west side, but does not affect Riggs Brook, other than crossing a shallow tributary of it. The lower reaches of Fisher Brook, where cold water species were found, will not be directly affected by any of the alternatives.

The quantity and quality of habitat for all fisheries in the Kennebec River will be affected by the removal of the Edwards Dam. MDOT will comply with all requirements for protecting habitat during construction and minimizing permanent impacts within surface water bodies. A forthcoming report from the National Marine Fisheries Service (NMFS) will outline conditions for construction so that anadromous fish species, including Atlantic salmon, are not likely to be adversely affected by this project. These conditions will likely include timing restrictions on instream work, limitations on the number of piers, and restrictions on how the instream work is carried out (e.g. from barges or temporary work platforms).

Current design projections for the bridge indicate that there will be 2-3 piers in the Kennebec River. Pier locations are not determined, but likely will be in a combination of seasonally flooded and permanently flooded habitat. Impacts will be from direct filling and changes in substrate morphology due to flow diversions. The piers will likely comprise a total footprint of not more than 3,300 square feet (300 square meters). Individual species within the footprint will be lost, except for freshwater mussels, which will be relocated. Piers placed within flowing waters will develop scour in upstream areas which may fill back in with sediments from up river during lower flows. Sediments will be deposited downstream of the piers in a slower flow shadow. The shadow areas are used as hiding and resting places for fish, and can increase the habitat within a river.

Invertebrates

Fresh water mussels occurring at the crossing location will be relocated to a suitable habitat prior to construction to reduce impacts to their populations. No long-term impacts to invertebrate populations are anticipated, regardless of the alternative selected.

Vernal and Seasonal Pools

There are no vernal or seasonal pools directly affected by either Alternative A-1 or A-2. Alternative B would impact two vernal or seasonal pools in the vicinity of Route 201/100. One pool had unidentified tadpoles. No amphibians were observed in the second pool. Alternative B will fill 500 ft^2 (46 m^2) of one pool and all of the second, for a total of 2000 ft^2 (206 m^2) of pool habitat. Additional information regarding these pools can be found in the *Natural Resources Report* (Bostwick 1999).

Riffle and Pool Complexes

According to the Clean Water Act, “Discharge of dredged or fill material can eliminate riffle and pool areas by displacement, hydrologic modification, or sedimentation” (40 CFR Sec-

tion 230.45). No displacement or hydrologic modification is anticipated from any of the alternatives. Alternatives A-1 and A-2 are located downstream of the major riffles in Riggs Brook, and no impacts from sedimentation are anticipated to these areas. Alternative B is adjacent to Fisher Brook, and strict erosion and sediment controls will be implemented to avoid sedimentation impacts to the riffle and pool habitat in this stream.

4.2.5 Wetlands

Table 4-4 shows the amount of wetlands that will be affected by the alternatives. Specific information regarding location and size of individual wetlands can be found in the *Natural Resources Report* (Bostwick et al, 1999). There will be no mechanized wetland clearing outside of the right-of-way.

Table 4-4. Wetland Impacts (square feet/ **acres** / square meters)

Alternative	Forested	Shrub–scrub	Emergent	Total
A – 1	17,196 0.4 1,598	102,925 2.4 9,562	273,953 6.3 25,450	394,074 9.1 33,948
A – 2	8,028 0.2 746	70,995 1.6 6,595	357,053 8.2 33,170	478,027 11.0 44,409
B	67,779 1.6 6,297	23,011 0.5 2,138	223,051 5.1 20,721	313,841 7.2 29,156

Wetland Compensation

After wetland impacts have been avoided and minimized to the greatest extent possible, MDOT will compensate for any unavoidable impacts by complying with the Clean Water Act Section 404(B)(1) guidelines, the accompanying Memorandum of Agreement between the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency, the Highway Methodology (U.S. Army Corps of Engineers, New England Division, November 1993), and Chapter 310 of the Maine Natural Resource Protection Act (NRPA). The level of compensation proposed in the project permit application will be appropriate and practicable (defined in Section 230.3(q) of the Federal guidelines), as determined by the state and federal permitting agencies.

The goal of compensation will be to replace wetland functions that will be affected by project activities. The principal functions and values identified in the functional assessment portion of the Augusta River Crossing Natural Resources Report (Bostwick et al, 1999 as revised) will be used to develop appropriate compensation. The amount of compensation provided will be guided by the ratios in Chapter 310 of NRPA as follows:

- 1:1 for restoration, enhancement, or creation to compensate for impacts to wetlands not of special significance;

- 2:1 for restoration, enhancement, or creation to compensate for impacts to wetlands of special significance; or

- 8:1 for preservation, including adjacent upland areas, to compensate for impacts to all wetlands.

Agency Coordination -- The process of developing the appropriate type and amount of compensation will consist of a site identification and selection (i.e. site search) phase, a compensation plan development phase, and may include construction and post-construction monitoring phases. MDOT will coordinate closely with the state and federal permitting agencies during these phases of the compensation process as follows:

• Review, evaluation and approval of site search results at an MDOT Interagency Meeting. MDOT will provide preliminary information on the characteristics of potential sites including, but not limited to, location, size, ownership, existing condition and proposed actions, as appropriate to allow the agencies to decide which site(s) provide acceptable compensation. This may include other information and field visits, as requested, to clarify the proposed compensation.

• Narrative Compensation Plan to be submitted with the permit application. This plan will include a project background, and a summary of the site search and selection process. For the selected site or sites the plan will contain a description of the existing site conditions, the compensation objectives, proposed designs including 8½ by 11 inch plans at a preliminary (30-40%) level of detail, typical cross sections, an anticipated project schedule, proposed construction activities, post construction monitoring performance standards and contingency measures, and a copy of a draft Covenants and Restrictions or Conservation Ease-

ment document protecting the area in perpetuity. In addition, any other information or site data necessary to approve the compensation plan will be included as appropriate.

• Construction plans, as appropriate, will be submitted to the permitting agencies prior to advertising.

• Annual and final monitoring reports will be prepared, as required, to assess site development relative to specific performance standards and the attainment of project goals.

Site Search -- MDOT has conducted a preliminary review of the three alternative corridors to identify prospective compensation areas for further study and has developed some preliminary site search criteria.

On May 11, 1999, MDOT held an interagency field review of the three alternatives retained for further study. During the review, MDOT staff noted 13 areas along or within the vicinity of Alternatives A-1, A-2, and B, that may have potential to provide some compensation for the estimated impacts. They consist of a mixture of prospective restoration, enhancement, preservation and creation areas that vary in size. Reconnaissance-level information was collected about the areas at that time. These areas will be fully evaluated later in the site search process to assess their actual compensation potential. Those that have potential to compensate for project impacts, and are available and practicable, will be added to the list of sites presented to the state and federal permitting agencies for consideration.

Preliminary search criteria developed to date include, for example, location, size, compensation type, functions and values, availability, and overall feasibility of identified sites. Potential sites with the following characteristics will be preferred:

1) Potential sites along or in close proximity to the selected centerline alternative and sites within the watershed boundaries of the affected wetlands will be considered. Other sites outside this area will also be considered if they offer significant wetland benefits and are consistent with local, regional, or state wetland conservation priorities.

2) Sites large enough to provide compensation at one or two locations will be preferred over small sites.

3) Sites that offer the potential to restore previously degraded wetlands will be preferred, followed by sites that offer wetland enhancement, wetland and upland preservation, or wetland creation potential.

4) Sites with the potential to provide "in kind" functional replacement will be preferred. If no suitable sites are identified, replacing functions "out of kind" will be considered.

In November, 1999, MDOT hired an environmental consultant to conduct a thorough search for appropriate compensatory mitigation sites and to assist MDOT in developing the compensation plan. During the initial phase of the search the consultant will review the characteristics of the existing wetlands along the three alternatives retained for further study, compile existing information about natural resources in the search area, and develop appropriate search criteria. Field reconnaissance and site evaluations began the winter of 1999. After a preferred centerline alternative is selected and approved, the site search and search criteria will be refined as necessary to match the compensation to the specific proposed affected wetlands.

During the search process MDOT will coordinate with the public to explain the compensatory mitigation process, to solicit suggestions on potential sites and to receive comments. MDOT will contact property owners of the more promising sites to determine the availability of selected parcels.

The information collected during the search process will be used to determine the practicability of the potential sites. The evaluation will take into consideration factors such as access, constructability, cost, public input, soils and hydrology, surrounding land use patterns, and other relevant information. A summary of the characteristics, the availability and the results of the practicability analysis of the potential sites will be submitted for permit agency review.

4.2.6 Floodplains

Federal Emergency Management Agency (FEMA) mapping was used to estimate the area of 100-year floodplain within the 1000-foot (300 m) corridors and the 200-foot (60 m) alternatives. Results are presented in Table 4-5. Actual impacts to the floodplain from the construction of any of the alternatives will be minor. No 100-year floodplain was identified within either Connector.

Table 4-5. Predicted Impacts to 100-year Floodplain

Alternatives	FEMA: acres (hectares) of 100-year flood plain in 1000' (300 m) Corridor	FEMA: acres (hectares) of 100-year flood plain in 200' (60 m) Alternative
A-1	11.88 (4.81)	2.84 (1.14)
A-2	19.00 (7.69)	3.28 (1.31)
B	17.75 (7.19)	2.52 (1.01)

4.2.7 Rare, Threatened and Endangered Species

Shortnose sturgeon, a federally listed endangered species, are known to inhabit the Kennebec River, and will now be able to access the area of the proposed bridge due to the removal of the Edward's Dam. Section 7(a)(2) of the Endangered Species Act (ESA) requires every federal agency, in consultation with the Secretary of the Interior, to insure that any action it authorizes, funds, or carries out, is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. The consultation process necessary to proceed with federal actions is outlined in subsequent sections of the ESA.

MDOT has begun and will continue coordinating with the National Marine Fisheries Service (NMFS) and the Maine Department of Marine Resources (DMR) to comply with the ESA and to develop a plan for avoiding and minimizing adverse impacts to Shortnose sturgeon resulting from this project. A Biological Assessment is being prepared to evaluate potential impacts to Shortnose sturgeon from the project. The Biological Assessment, as required by the ESA, will contain information relating to the following:

- A review of literature and other information relating to the species;
- Results of on-site inspections of the area affected by the action;
- Views of recognized experts on the species; and,
- Affects of the action on the species, including measures to minimize those affects.

According to Tom Squiers, a Biologist from DMR and an expert on Shortnose Sturgeon, the area of river where the proposed bridge will be located would be utilized only as a migratory

route and not as an area for spawning (Squiers 2000). He feels that the Sturgeon may spawn in the area of a deep hole near Seven Mile Island [5 miles (8 km) upstream from the project site] or possibly even all the way to Waterville, if in fact the sturgeon utilize the area of the Kennebec River above the former Edward's Dam location.

It is anticipated that the new bridge will consist of at the most three piers in the Kennebec River. Each pier is anticipated to impact approximately 1,100 square feet (100 m^2) of river bottom, for a total impact of approximately 3,300 square feet (300 m^2) or less. In order to avoid and/or minimize impacts to Shortnose sturgeon, MDOT will among other things propose a time of year in-water work restriction. The anticipated proposed dates for not allowing work in the water would most likely be during the months of April and May, the time when the sturgeon would be migrating to and from spawning sites.

While the Biological Assessment has already been started, some of the information necessary to complete it will not be available until more work is done relating to the actual design of the project and the piers associated with the bridge. MDOT will continue working with the NMFS leading up to and beyond their issuance of a Biological Opinion for Shortnose sturgeon for this project. Any data on changes in habitat and use of areas above the former Edwards Dam collected prior to construction will be considered.

MDIFW recommends that MDOT develop a relocation plan for populations of freshwater mussels that may be affected by the bridge and associated roadway so that the effects of construction and subsequent maintenance do not negatively impact these species. MDIFW developed a similar plan for the Edwards Dam removal. The transplantation for this project has been discussed and coordinated tentatively between MDIFW and MDOT, and a written plan will be developed by MDOT as part of its mitigation efforts. Prior to its implementation, the plan will be presented to MDIFW for review and approval.

4.3 ATMOSPHERIC ENVIRONMENT

4.3.1 Air

The one-hour and eight-hour CO concentrations at locations of highest concentrations for the alternatives for the year of completion (2005) and the design year (2025) were predicted (Table 4-6). Values were compared to existing 1999 concentrations. Differences in concentrations for the alternatives and the various analysis years reflect the distribution of traffic between these conditions, the traffic growth from 1999 to 2005 to 2025, and the reduction, over time, of vehicle emissions. Increased traffic and at-grade intersections associated with the build alternatives are predicted to result in future one-hour concentra-

tions of 8.1 to 8.5 ppm (2005 and 2025) with Alternative A-1, 9.0 to 9.3 ppm with Alternative A-2, and 7.9 to 8.0 ppm with Alternative B. Corresponding 8-hour values are 5.1 to 5.4 ppm, 5.8 to 6.0 ppm, and 5.0 to 5.0 ppm for Alternative A-1, A-2, and B, respectively.

Table 4-6. Predicted Future 1-hour and 8-hour CO Concentrations

Alternative and Condition	Worst-Case 1-Hour / 8-Hour CO Concentrations (ppm)		
Location	1999	2005	2025
Alternative A-1 and Connector A	n/a	8.1 / 5.1 N. Belfast Intersection S.W. Quadrant	8.5 / 5.4 N. Belfast Intersection S.W. Quadrant
Alternative A-2 and Connector A	n/a	9.0 / 5.8 N. Belfast Intersection S.W. Quadrant	9.3 / 6.0 N. Belfast Intersection S.E. Quadrant
Alternative B and Connector B	n/a	7.9 / 5.0 Riverside Dr. Intersection S.E. Quadrant	8.0 / 5.0 Riverside Dr. Intersection S.E. Quadrant

Notes:
All values include backgound concentrations of 4.0 ppm for 1-hour and 2.0 ppm 8-hour
8-Hour Concentration = [(1-Hour Concentration - 4.0 ppm) x (Adjustment Factor)] + 2.0 ppm
Adjustment factor = 0.76 based on traffic variation and stability factor fluctuation during worst case 1-hour period;
8-hour period was calculated to be from 10 a.m. to 7 p.m.and contain 3 hours of F stability and 5 hours of D stability;
this period contains National Ambient Air Quality Standards for CO are 35 ppm 1-hour and 9 ppm 8-hour

While increases in concentrations are indicated with the build alternatives at receptor sites in the vicinity of proposed at-grade signalized intersections, slight improvements in air quality result from the build alternatives at the intersection of Routes 201/100 and 202/3. This intersection is representative of conditions at points removed from the immediate influences of the alternatives evaluated (Table 4-7).

None of the receptor sites analyzed, regardless of alternative or analysis year, are predicted to experience violations of either the one-hour or eight-hour NAAQS for CO. No air quality mitigation is required.

Table 4-7. Predicted Improvements in Air Quality at the Route 201/100 and 202/3 Intersection.

Alternative and Condition Location	Worst-Case 1-Hour / 8-Hour CO Concentrations (ppm) 1999	2005	2025
A Alternatives and Connector A	n/a	6.9 / 4.2	7.0 / 4.3
Alternative B and Connector B	n/a	7.4 / 4.6	7.6 / 4.7

Notes:
All worst-case concentrations occur in the intersection's southwest quadrant
All values include backgound concentrations of 4.0 ppm for 1-hour and 2.0 ppm 8-hour
8-Hour Concentration = [(1-Hour Concentration - 4.0 ppm) x (Adjustment Factor)] + 2.0 ppm
Adjustment factor = 0.76 based on traffic variation and stability factor fluctuation during worst case 1-hour period; 8-hour period 'was calculated to be from 10 a.m. to 7 p.m.and contain 3 hours of F stability and 5 hours of D stability; this period contains approximately 70 percent of the daily traffic
National Ambient Air Quality Standards for CO are 35 ppm 1-hour and 9 ppm 8-hour

4.3.2 Noise

FHWA Criteria

To determine if highway noise levels are compatible with various land uses, the FHWA has developed noise abatement criteria and procedures to be used in the planning and design of highways (Table 4-8). These abatement criteria and procedures are in accordance with Title 23 Code of Federal Regulations (CFR), Part 772, U.S. Department of Transportation, FHWA, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*. These criteria address both absolute noise levels and increase in noise levels above existing levels.

MDOT's *Highway Traffic Noise Policy* defines an impacted receiver as "Any receiver which approaches (within 1 dBA) or exceeds the Noise Abatement Criteria (NAC) for the corresponding land use category, or any receiver that exceeds existing noise levels by 15 dBA." Consideration for noise abatement measures must be given to receptors that fall into either category.

The computer model used to predict future noise levels was the FHWA Traffic Noise Model (TNM). The TNM uses the number and type of vehicles on the planned roadway, their speeds, the physical characteristics of the road (e.g., horizontal and vertical alignment,

grades, cut or fill sections, etc.), receptor location and height, and, if applicable, barrier type, barrier ground elevation, and barrier top elevation.

Table 4-8. Noise Abatement Criteria: Hourly A-Weighted Sound Level — Decibels (dBA)

Activity Category	$L_{eq}(h)$	Description of Activity Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (Exterior)	Developed lands, properties or activities not included in Categories A or B above.
D	—	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public, meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: *Procedures for Abatement of Highway Traffic Noise and Construction Noise, 23 Code Of Federal Regulations (CFR) Part 772;* December 1991.

Noise Analyses

Noise impact analyses were conducted within the 11 Noise Sensitive Areas (NSA). Noise impacts would occur in each NSA except for NSA 2 (Table 4-9). The table includes estimated existing, predicted future 2025 build noise levels, increases over existing noise levels, the number of receptor sites modeled in each NSA, and the total number of receptors represented by the modeled sites. Impacts were determined based on receptor noise levels that approached (within 1 dBA) or exceeded the FHWA and MDOT NAC level of 67 dBA for Category B sensitive receptors and noise level increases of 15 dBA.

The design speed of 50 mph (80 km/h) was used for new roadways. Existing roadways were modeled at speeds ranging from 25 mph (40 km/h) (Western Avenue) to 50 mph (80 km/h) (Old Belgrade Road and Route 201/100) as determined by field observations. I-95 traffic was modeled at 65 mph (105 km/h) for automobiles and 60 mph (95 km/h) for trucks.

Future 2025 predicted build noise levels would range from 52 to 76 dBA at the sensitive receptors affected by Alternative A-1. Increases over existing noise levels would range from 1 to 13 dBA. Impacts would occur at 24 receptors; 16 of these impacts would occur along Route 201/100 in NSA-6. Most of these impacts would occur as a result of traffic noise from Route 201/100 and would occur with or without traffic introduced by Alternative A-1. Consideration of abatement associated with Alternative A-1 would be warranted in NSAs 1, 4, 6, and 9.

Predicted future build noise levels with Alternative A-2 would range from 48 to 75 dBA. Increases over existing noise levels of up to 17 dBA would result at the Riverside Mobile Home Village in NSA-7. Impacts would occur at 23 locations including 14 receptors along Route 201/100. Traffic noise from Route 201/100 would be the main noise source in this area. Consideration of abatement along Alternative A-2 would be warranted in NSAs 1, 4, 6, 7, and 9.

Predicted future build noise levels would range from 53 to 73 dBA as a result of traffic noise from Alternative B. Increases over existing noise levels would range from –2 to 14 dBA. Impacts would occur at 25 receptors along the Alternative B alignment. The majority of these impacts would occur in NSA-5 and NSA-8 as a result of traffic noise on existing roadways. Consideration of abatement would be warranted in NSAs 1, 3, 5, and 8.

When consideration of abatement is warranted, examination and evaluation of alternative noise abatement measures for reducing or eliminating noise impacts must be considered. Traffic control methods (such as speed limit reductions) have relatively insignificant effects on noise levels and are difficult to consistently enforce. Noise barriers reduce noise levels by blocking the sound path (and thus diffracting sound) between roadways and NSAs. For a noise barrier to be considered feasible by MDOT, it must provide a minimum insertion loss of 7 dBA (preferably 10 dBA) for first row benefited receptors, be consistent with safety and operational factors, be feasible to construct given the topography of the area, and be reasonable in terms of cost/benefit.

Table 4.9. Predicted Noise Impacts

NSA	No. of Sites in NSA Modeled	1999 Existing	2025 No Build	Impacted Locations	Year 2025 Build Alternatives: Alt. A–1	Impacted Locations	Alt. A–2	Impacted Locations	Alt. B	Impacted Locations	Con. A	Impacted Locations
NSA 1	12											
Noise Level Range		59–66	60–68	3	62–68	3	61–68	3	61–68	3	na	
IOE Range			2	0	1–4	0	1–4	0	1–4	0	na	
NSA 2	10											
Noise Level Range		51–54	52–55	0	57–65	0	57–65	0	54–65	0	na	
IOE Range			2	0	4–13	0	4–13	0	2–9	0	na	
NSA 3	8											
Noise Level Range		47–60	48–62	0	na		na		57–73	4	na	
IOE Range			2	0	na		na		3–14	0	na	
NSA 4	10											
Noise Level Range		46–61	48–63	0	52–68	2	53–67	2	na		na	
IOE Range			2	0	4–13	0	5–14	0	na		na	
NSA 5	14											
Noise Level Range		62–74	63–76	10	na		na		63–73	9	na	
IOE Range			2	0	na		na		(–2)–3	0	na	
NSA 6	30											
Noise Level Range		46–74	48–76	15	55–76	16	54–75	14*	na		na	
IOE Range			2	0	1–9	0	(–1)–8	0	na		na	
NSA 7	12											
Noise Level Range		46	48		na		48–63	0	na		na	
IOE Range			2		na		3–17	3	na		na	
NSA 8	22											
Noise Level Range		48–71	50–73	8	na		na		53–72	9	na	
IOE Range			2	0	na		na		2	0	na	
NSA 9	11											
Noise Level Range		57–64	59–66	1	63–70	3	62–69	1	na		na	
IOE Range			2	0	5–9	0	3–5	0	na		na	
NSA 10	37											
Noise Level Range		48–68	50–70	9	na		na		na		50–74	32 **
IOE Range			2	0	na		na		na		2–7	
NSA 11	11											
Noise Level Range		50–65	52–67	1	na		na		na		na	
IOE Range			2	0	na		na		na		na	

* The Corridor A–2 alignment takes approximately four receptors.
**The Connector A alignment takes approximately four receptors.
***The Connector B alignment takes approximately four receptors.

IOE = Increase over existing
na = Not applicable

Abatement Feasibility and Reasonableness

An evaluation of noise abatement feasibility and reasonableness associated with each alternative was conducted, with the following results:

- In NSA-1 there are no feasible means to mitigate noise at the three impacted receptors. The FHWA Criteria would be exceeded at these receptors because of traffic noise from Old Belgrade Road. Mitigating noise from the new alignment would have no noticeable effect and mitigating noise from Old Belgrade Road would not be possible because of required driveway access.
- In NSAs 5, 6, and 8, mitigation would not be feasible because of traffic noise from existing roadways. Receptors along Route 201/100 in NSA-5 and NSA-6 and along Route 202/3 in NSA-8 would experience future noise levels approaching or exceeding the FHWA Criteria with or without the traffic noise from the proposed alignments. Mitigation of future Alternative A or Alternative B traffic noise would be completely negated by traffic noise from the existing roadways.
- In NSAs 3, 4, and 11, mitigation of future traffic noise from the proposed alignments would not be feasible because of sight requirements at the intersections.
- In NSA-7, abatement from noise generated by traffic on proposed Alternative A-2 would be feasible at the Riverside Mobile Home Village. A wall 16 feet (5 m) high and 1200 feet (350 m) long along the shoulder of the roadway would reduce noise levels by up to 10 dBA at front row receptors. Approximately 21 receptors in the mobile home village would receive reductions of at least 5 dBA. The cost of the barrier would be approximately $384,000 or $18,286 for each residence benefitting from the mitigation.
- In NSA-9, a 20-foot (6 m) high wall along the Alternative A-1 alignment would reduce future build noise levels to approximately 65 dBA. The overall reduction would be limited to 4 dBA because of the unabated noise from traffic on Church Hill Road. Mitigation would be unfeasible because of the MDOT minimum requirement of 7-dBA reduction at front row sensitive receptors.
- In NSA-10, abatement of noise levels along Connector A would not be feasible because of access openings required for driveways and cross streets.

4.4 LAND USE, HISTORIC, AND SOCIOECONOMIC ENVIRONMENT

4.4.1 Land Use and Zoning

Estimated impacts to land use types and zoning districts are presented in Tables 4-10 and 4-11. Undeveloped land in the Planned Development zone has the highest level of impact for all

alternatives, reaffirming that this project is consistent with the City of Augusta's *Growth Management Plan*. The construction of any of the alternatives will relieve development pressure and traffic congestion from the downtown area, helping to preserve neighborhoods and the Capital District.

One primary component in determining impacts to land use and zoning along the new roadway is its designation as a limited access facility. Restricting access to existing grade intersections will essentially preserve existing land uses in areas without other access. Some new commercial growth along the intersections of Routes 104, 201/100, and 202/3 is anticipated, and this will occur in the Planned Development and/or Local Business zones designed to accommodate such growth.

Table 4-10. Estimated Impacts to Land Use Types (**Acres**/hectares)

Land Use	Alternative		
	A1	A2	B
Residential	9.5 3.8	7.6 3.1	7.4 3.0
Retail / Business	0.0	1.0 0.4	3.7 1.5
Undeveloped Land	71.4 28.9	80.8 32.7	44.0 17.8

Figure 4-1. Estimated Impacts to Land Use Types Expressed as a Percentage.

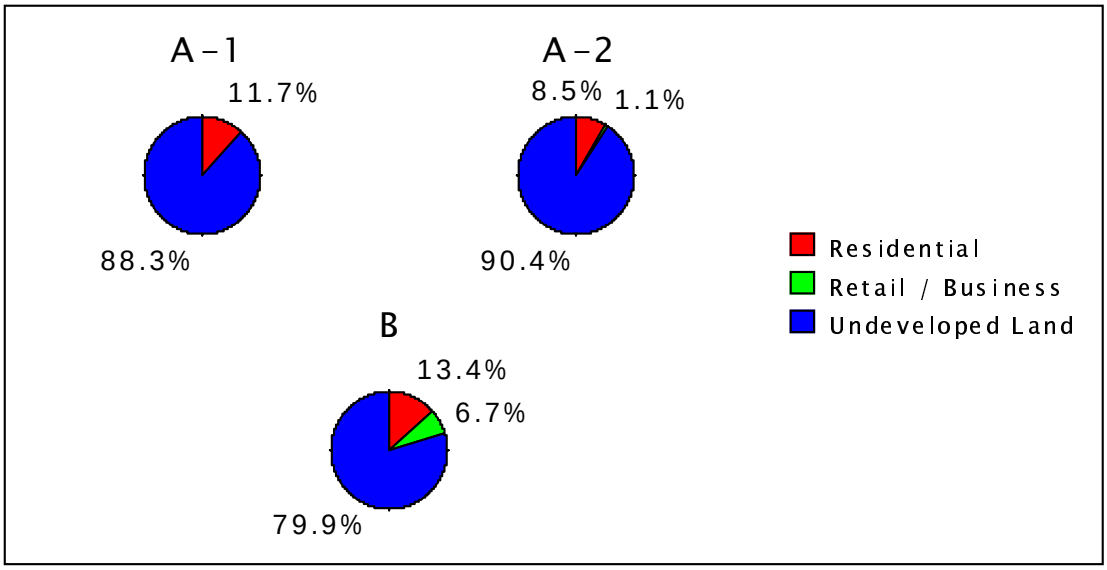
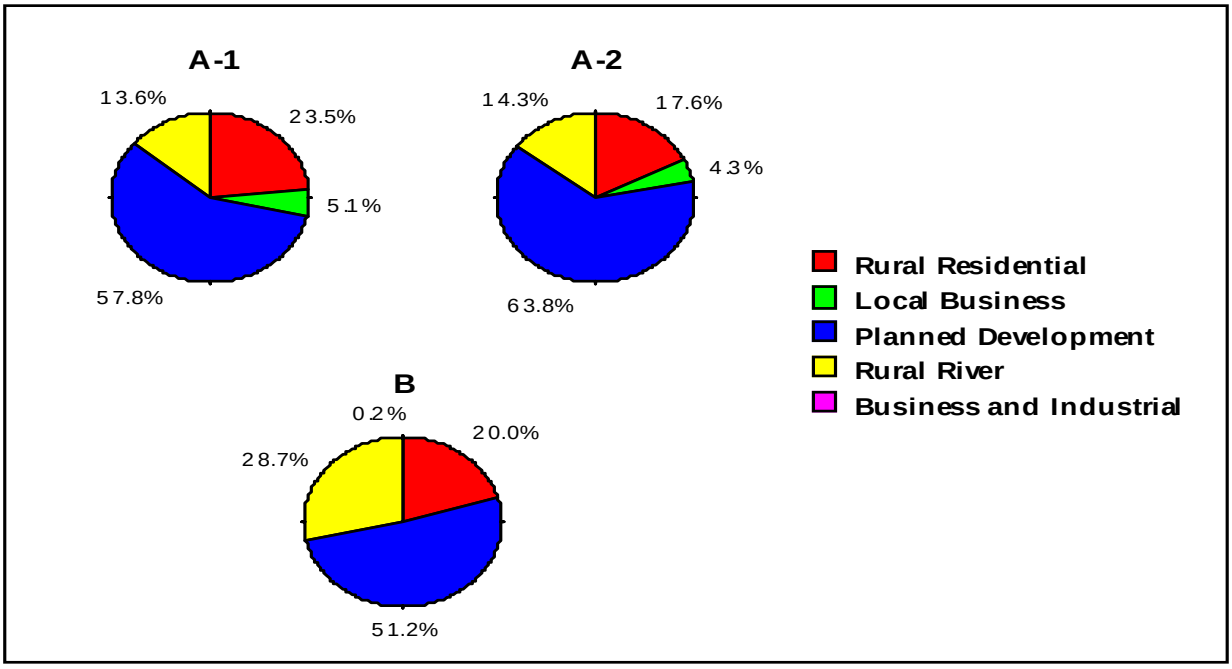


Table 4-11. Estimated Impacts to Zoning Districts (**Acres**/hectares)

Zoning District	Alternative A-1	Alternative A-2	Alternative B
Rural Residential	19.0 7.7	13.8 5.6	11.0 4.4
Local Business	4.1 1.7	3.4 1.4	0.0
Planned Development	46.8 18.9	50.0 20.2	28.2 11.4
Rural River	11.0 4.4	11.2 4.5	15.8 6.4
Business and Industrial	0.0	0.0	<0.1
Total:	±80.9 32.7	±78.4 31.7	±55.1 22.3

Figure 4-2. Estimated Impacts to Affected Zoning Districts Expressed as a Percentage.



A special consideration for Alternative A-1, given the proposed limited access designation for the new roadway, is that this alignment cuts off access to the industrial landfill which lies just to the south. Alternative access to the facility would have to be provided.

Some changes in the character of the landscape are inevitable with the construction of either alternative. However, with appropriate design considerations such as noise and visual buffering, direct adverse impacts to existing land uses can be minimized. Additionally, the City of Augusta should be proactive in determining how much and what type of development is appropriate for areas adjacent to the new roadway.

4.4.2 Community Resources

Community Facilities and Services

No community facilities or services are directly impacted by any of the proposed alternatives. However, the construction of any of the alternatives would be beneficial to the Augusta area. The combination of an additional river crossing and a reduction in congestion through the city will improve access to community facilities and services on both sides of the river. In addition, emergency vehicles can opt for the new facility during peak traffic flows or when an accident has blocked passage through the rotaries.

Neighborhood and Community Cohesion

Alternatives A-1 and A-2 bisect undeveloped land between two emerging neighborhoods at Eight Rod Road. Because Eight Rod Road will not be provided access to the highway, long-term direct impacts to these neighborhoods will be limited. At Route 201/100, both alternatives bisect cohesive neighborhoods. There are numerous single-family homes, scattered with multifamily units, that will be directly impacted by the construction of these alternatives. The remaining residential dwellings will be indirectly impacted by the increase in traffic on Route 201/100 and potential conversion into commercial enterprises. The neighborhoods may also be directly impacted by the approach work at the intersection of the new alignment and Route 201/100.

Alternative B has impacts similar to the A alternatives on the west side of the Kennebec River. On the east side, it bisects Route 201/100 in the vicinity of a transition zone from commercial to residential. The neighborhoods to the north may be indirectly impacted by the increase traffic on Route 201/100 and directly impacted by the approach work at the inter-

section of Route 201/100 and Alternative B.

East of Route 201/100, Alternative B bisects undeveloped lands that are actively farmed. The alternative intersects Route 202/3 in the vicinity of commercial properties and a power company substation. There are cohesive neighborhoods to the West of this intersection that may be indirectly impacted by the increased traffic.

4.4.3 Economic Impacts

The current growth trend in employment and retail sales is expected to continue in the Augusta Labor Market Area. The City's a *Growth Management Plan* sets forth a policy of concentrating future commercial and industrial developments rather than allowing haphazard development that can lead to sprawl (Augusta 1988). This policy has been interpreted by the designation of certain routes as growth areas and directing new development in a concentrated area north of the existing bridges through the creation of Planned Development zones. To this end, expansion of city infrastructure (water and sewer) into Planned Development zones has been incorporated into economic development plans by the City. A third bridge crossing is viewed as an integral step toward a planned approach for the anticipated economic growth of Augusta.

A search of available literature on the economic effects of new highways and bypasses was conducted. Studies located support the consensus in Augusta that the new roadway and river crossing will have little, if any, adverse impact on the local economy. A study completed by the Wisconsin Department of Transportation, *The Economic Impacts of Highway Bypasses on Communities* (1998), found that "in most communities, highway bypasses have little adverse impact on overall economic activity." Another key project finding from that study concluded that "communities view their bypasses as beneficial overall, while at the same time communities and individual businesses understand that the bypasses presented changes that must be addressed proactively." Augusta is a regional economic and cultural center and the presence of government offices, schools, medical facilities, neighborhoods, shopping centers and churches will continue to draw the regional population to Western Avenue and through the downtown.

Predicted economic impacts have been evaluated in terms of land values, displacements, and overall predicted impacts as follows:

Land Values

It is anticipated that properties near the at-grade intersections along the selected alternative

will increase in value as existing businesses expand or new commercial or industrial development occurs. The value of property not currently accessible or made inaccessible from construction will increase if separate access roads are constructed. Residential property owners adjacent to the new facility may see the value of their properties as homes decrease because of potential visual and noise impacts. The value of residential properties within Planned Development zones should increase as commercial and industrial development occurs along the corridor.

A search of the literature on the impact of new highways and bypasses on land values was conducted. A recent Transportation Research Board (TRB) study looked at the impact of bypasses on land values and found that land values along new bypasses increased in 68 out of 68 cases reviewed (NCHRP, 1996); although it is not clear if the bypasses studied were limited access, as proposed for this project. Interestingly, the TRB study also found that land values along the existing routes increased in 47 of 50 cases. Although property value increases in Augusta have not kept pace with the rest of the State of Maine, over time the current economic growth trend should result in an overall increase of property values in the area, including along any new transportation facilities.

Displacements

Federal and federally-assisted actions which require the acquisition of property must comply with Title VI of the Civil Rights Act of 1964 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (49USC 4601 et seq). Each of these legislative controls protects owners from unfair and inequitable acquisition of property.

The alternatives were located and surveyed in such a way as to impact the fewest property owners possible. During the location studies for this project, alignments were adjusted to avoid or minimize adverse impacts on the businesses and residences in the study corridors. Table 4-12 presents affected properties by type as well as displacement totals to provide a comparison of impacts by alternative. Alternative B displaces the fewest residences. However, it will displace Fort Western Tire on Route 202/3 and is the only alternative to directly affect an established business (other than multi-family commercial property). There is adequate replacement housing and developable land in the Augusta area to meet the needs of displaced property owners.

Table 4-12. Affected Properties / Displacements

Affected Properties	Alternative A1	Alternative A2	Alternative B
Single Family Residential	6	7	2
Two Unit Apartment	0	2	0
Three Unit Apartment	1	0	1
Four Unit Apartment	1	1	1
Mobile Homes	0	0	1
Businesses	0	0	1
Garages / Sheds	3	6	4
Barns	3	3	3
Vacant Buildings	1	1	0
Total:	15	20	13
Residential/Commercial Displacement Totals*:	13/2	13/2	9/3

Source: MDOT Right-of-Way

*Each unit of a multi-unit apartment is counted a one residential displacement. Each multi-unit building is counted as one business.

Predicted Economic Impacts

Although literature on the economic effects of bypasses is not abundant, available studies support the apparent general consensus in Augusta that the new roadway and river crossing will have little, if any, adverse impact on the local economy. A study completed by the Wisconsin Department of Transportation, *The Economic Impacts of Highway Bypasses on Communities* (1998), found that "in most communities, highway bypasses have little adverse impact on overall economic activity." Another key project finding from that study concluded that "communities view their bypasses as beneficial overall, while at the same time communities and individual businesses understand that the bypasses presented changes that must be addressed proactively." Augusta is a regional economic and cultural center and the presence of government offices, schools, medical facilities, neighborhoods, shopping centers and churches will

continue to draw the regional population to Western Avenue and through the downtown.

Predicted overall economic impacts resulting from the construction of either alternative are anticipated to be generally equivalent because of the similarity in geographic location and proximity to the downtown, and similarities in land use, zoning and displacements (Table 4-13).

Table 4-13. Predicted Economic Impacts

Type of Impact	Predicted Impacts - Alternatives A1, A2, and B
Direct Positive Short-term	Increase in construction and construction-related jobs.
Direct Positive Long-term	Ease in congestion downtown and on Western Ave may increase desirability for shoppers and businesses. Improved access to the Marketplace at Augusta. General increase in transportation and travel efficiency.
Indirect Positive Long-term	Increase in tax revenue as commercial property values rise along and adjacent to alternative.
Direct Negative Short-term	Displacement of any affected businesses, including multifamily housing units. Temporary decrease of business activity levels for existing businesses in the construction zones due to construction-related decreases in accessibility. High cost of project.
Direct Negative Long-term	Loss of local tax revenue as property is acquired for project. Increase in MDOT maintenance costs (general and winter) as more miles are added to system. Decrease in residential property values along alternative.
Indirect Negative Long-term	Possible decrease in business activity levels for food and fuel services on Western Ave.
Secondary/ Cumulative	Construction of access roads and associated developments adjacent to the new facility.

4.4.4 Pedestrian and Bicycle Use

The construction of a third river crossing in the Augusta area will benefit pedestrians and bicyclists by creating a safer travel environment within the city as trucks and through traffic opt for the new bypass, and by allowing more choices when traveling to and from the city. These benefits will be enhanced when considered in conjunction with the Go Augusta! and Kennebec River Trail programs currently being developed. From a use perspective, Alternative B would likely have higher numbers of pedestrian and bicycle users than either A alternative because of its closer proximity to downtown.

Adequate shoulder width will be provided to allow bicyclists to use the new facility. In areas with existing sidewalks, crosswalks will be provided.

4.4.5 Visual Environment

Alternatives

The differences in visual impacts between each alternative are outlined below with the number of affected viewer groups itemized for comparison.

Alternative A-1 and A-2 - These alternatives have one advantage over Alternative B in that the visual quality of Savage Park is not affected. Alternative A has one disadvantage in that it bisects an expansive field at the Eight Rod Road and the Route 104 sites. The A alternatives affect the same neighborhoods with a visual impact to approximately 32 residential structures. The visual impact totals for the other viewer groups include three agricultural entities and two retail/commercial establishments. The design quality of the Kennebec River bridge structure will affect recreational views from the Kennebec River basin.

Alternative B - This alternative has one advantage over Alternative A in that it does not bisect the open field areas at the Eight Rod Road and the Route 104 sites. Alternative B has one disadvantage in that it affects the visual quality of Savage Park. This alternative affects neighborhoods with a visual impact to approximately 25 residential structures. The visual impact totals for the other viewer groups include two agricultural entities, two retail/commercial establishments, and one recreational tract. The design quality of the Kennebec River bridge structure will affect recreational views from the Kennebec River basin.

Compensating Adverse Visual Impacts

The visual impacts that will need to be addressed are those that affect the residential viewer group at Eight Road Road, Route 104, Route 201/100 and Route 202/3. Techniques for minimizing these visual impacts could include grading the project to incorporate the highway into the existing terrain, minimizing the clearing of trees and shrubs along the right-of-way and developing a planting plan to integrate the highway into the surrounding natural and cultural environments.

The visual integrity of the Kennebec River bridge should reflect the visual character and importance of Maine's Capital City and the Kennebec River valley. This includes making available views from the new bridge without turning safety barriers into visual barriers and providing views for people using the Kennebec River and the Father Curran Bridge. Recommendations regarding design considerations for the new bridge structure can be found in the *Augusta River Crossing Visual Impact Assessment* (VanDusen 1999).

4.4.6 Historic Properties and Archaeological Sites

No historic properties were identified on either A alternative. The bridge alignment for Alternative B was designed on a curve rather than the more conventional straight approach and structure alignments in order to **totally avoid impacts to** the Parker Savage House, an historic property, and Savage Park, a recreational property. Avoiding these properties allows the study to move forward without involving the potentially lengthy Section 4(f) review process.

Four potential archaeological sites have been identified by the State Historic Preservation Officer (SHPO) through Phase I testing. Three of the sites are along Alternatives A-1 and A-2 and one site is along Alternative B. Based on Phase I testing, these sites are likely to be eligible for inclusion in the National Register of Historic Places. A Phase II survey has been initiated on the site on Alternative B to determine site boundaries and to determine National Register eligibility.

The SHPO has not selected a preferred alternative but rather has determined that the archaeological resources are important primarily for what can be learned from data recovery and have minimal value for preservation in place (Appendix C). For this reason, a separate 4(f) statement is not required. Upon completion of the Phase II survey, Phase III data recovery will be undertaken for any site determined to be eligible for the National Historic Register.

4.4.7 Uncontrolled Petroleum and Hazardous Wastes

Alternative Selection

Based on the findings of the Phase I Site Assessment for Uncontrolled Oil and Hazardous Waste, there is not sufficient evidence of contamination at any of the sites discussed that would influence the selection of Alternatives A or B. This, however, does not mean that there is no contamination or wastes along either alternative that could impact property acquisition, final design, construction costs, and/or worker health and safety. Phase II subsurface explorations of the preferred alternative will be necessary to detect and characterize undocumented contamination.

Avoidance and Minimization

Although the documented existence of soil and groundwater contamination is minimal within the alternatives, based on land use and setting it is recommended that areas in the following list be avoided (Table 4-14). These are areas with a relatively high potential for undocumented

contamination. If they cannot be avoided then additional investigations will be necessary during the design phase of the project.

Table 4-14. List of Areas to Avoid

Alternative	Facility	Potential for Contaminants
A	Fill Area in Magee Pit off Route 104	Buried Wastes
A	Former Brewer Dairy on Route 201/100	Free Petroleum Product in the Bedrock
A	Tree-Free Fiber on Church Hill Road	Special Waste and Demolition Debris The area licensed for deposition of solid waste should be avoided
B	Capitol City Tire on Route 104	Petroleum Hydrocarbons Cleaning Solvents
B	Wings Garage on Route 104	Petroleum Hydrocarbons Cleaning Solvents
B	Fort Western Tire and Junk Yard Route 202/3	Petroleum Hydrocarbons Cleaning Solvents Wastes

Preliminary Design Considerations

After selection of an alternative, determination of right of way acquisition needs, excavation limits, and drainage improvements, Phase II investigations should be undertaken on those properties with the potential for undocumented contamination. Phase II assessments will allow MDOT to better predict project costs, impacts of construction on contaminant migration, and worker health and safety requirements. The Phase II assessments should be complete before any right of way acquisitions are negotiated.

4.5 SECONDARY AND CUMULATIVE IMPACTS

4.5.1 Secondary Impacts

Secondary impacts differ from impacts directly related to the construction and operation of a project in that they are those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Anticipated adverse secondary impacts resulting from the construction of one of the proposed alternatives are described below.

Potential Need for a Connector Between Routes 202/3 and 17

The construction of any of the alternatives will result in an increase in traffic on the Church

Hill and Cony Roads between Route 202/3 and Route 17 (Table 4-15), although the decrease in LOS is not considered significant.

Table 4-15. Traffic Impact to Church Hill / Cony Roads

Alternative	Annual Average Daily Traffic (AADT) / Level of Service (LOS)			
	1995	2005	2015	2025
No-Build	2800 / B	3360 / B	3920 / B	4312 / B
Build (A-1, A-2, B)	3920 / B	4704 / B	5488 / C	6037/ C

The City of Augusta improved a section of Cony Road in 1997. The portion of Church Hill Road between Route 202/3 and Route 105 will likely require upgrade on the existing alignment to be adequate for projected increases in traffic (Connector A). Preliminary review indicates that approximately 0.71 acre (.28 hectares) of Palustrine emergent and scrub-shrub wetland would be impacted by such an upgrade. A possible new alignment for a connector has also been identified (Connector B). Preliminary review indicates that approximately 2.2 acres (.88 hectares) of Palustrine emergent, scrub-shrub, and forested wetland would be impacted if Connector B is constructed.

Future Potential Rest Area Relocation

Since the development and publication of the DEIS, MDOT is considering the future potential of relocating the existing northbound Augusta I-95 rest area to an area that would be bordered by I-95 to the west, the proposed new highway to the south and Eight Rod Road to the east. Access to any new facility located here would be from the new highway.

Potential benefits of relocating the rest area include:

- the elimination of the proposed collector-distributor road;
- the avoidance of costly remediation measures at the existing rest area;
- a reduction in bridge length for the new interchange;
- the opportunity to combine the rest area with the proposed tourist information center that the City of Augusta is currently promoting; and,
- providing a rest area/tourist information center that is accessible to northbound and southbound drivers on I-95 as well as travelers using the new highway going to and from the Belfast, Camden and Rockland areas.

Potential adverse impacts from rest area relocation include:

- adverse impacts to adjacent residential properties, including noise, light, and change in character; and,
- project cost.

If the relocation of the rest area is pursued, a supplemental environmental document will be required to evaluate potential impacts and comply with NEPA. This process would include full public participation and be carried out in accordance with the Highway Methodology.

Land Use

The new roadway will be limited access and will only be accessible from the interstate and the at-grade intersections of Routes 104, 201/100, and 202/3. Additional development may be "induced" by the facility if, for example, new frontage roads are constructed adjacent to it. It should be noted that the area around all retained alternatives has already been designated by the City of Augusta through the *Growth Management Plan* as a focal point for future development.

4.5.2 Cumulative Impacts

Cumulative impacts "result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). To assess cumulative impacts, other projects with local and regional significance currently in development or planned for the future were identified. These include:

- Expansions at the Mall at Augusta;
- The TDM/TSM Multi-modal efforts, both current and planned; and,
- The removal of the Edwards Dam.

No substantial adverse cumulative impacts were identified when any of these projects were considered in relation to the current river crossing project.

4.6 SUMMARY OF RECOMMENDED MITIGATION MEASURES AND PROJECT COMMITMENTS

Prevention and Mitigation of Impacts to Surface Waters

- The preferred alternative will be constructed in compliance with the MDOT manual Best Management Practices for Erosion and Sediment Control, Sept. 1997.
- The preferred alternative will be designated as located in a sensitive water resource watershed so the most stringent level of temporary erosion and sediment control will be required in the construction contract.
- Long-term stability of ditches and slopes should be included in the design of the

chosen alternative.

- Stormwater quantity will be analyzed for the preferred alternative and post-development peak flows will be kept to pre-development levels to the greatest extent possible.
- Recommendations and/or conditions developed by NMFS and DMR relating to construction methods and timing of instream work will be incorporated into construction plans for the project.

Wetlands

- Compensation will be provided as required by applicable federal and state regulations.

Threatened and Endangered Species

- A written transplantation plan for the relocation of freshwater mussels will be developed by MDOT. Prior to its implementation, the plan will be presented to MDIFW for review and approval.
- Recommendations and/or conditions regarding Shortnose sturgeon developed by NMFS and DMR relating to construction methods and timing of instream work will be incorporated into construction plans for the project.

Noise

- Abatement from noise generated by traffic on **Alternative A-2** would be feasible at the Riverside Mobile Home Village by constructing a wall 16 feet (5 m) high and 1200 feet (350 m) long along the shoulder of the roadway. No abatement measures are necessary for Alternatives A-1 or B.

Pedestrian and Bicycle Use

- Adequate shoulder width will be provided to allow pedestrians and bicyclists to use the new facility.
- In areas where there are existing sidewalks, crosswalks will be provided.

Visual Environment

- Appropriate landscape treatments will be determined during final design as needed.
- Any salvage/junk yards exposed during construction will be screened from the traveling public.

Historic Properties and Archaeological Sites

- The Phase II archaeology survey will be completed to determine National Register eligibility and a Phase III data recovery will be implemented as necessary to comply with Section 106.

Uncontrolled Petroleum and Hazardous Wastes

- Phase II hazardous waste investigations will be undertaken on those properties identified along the selected alternative as having the potential for undocumented contamination. The Phase II Contaminant Assessments will be complete before any right of way acquisitions are negotiated.

Value Engineering

- The Code of Federal Regulations, Title 23 Part 627, requires the application of value engineering (VE) to all Federal-aid highway projects on the National Highway System with an estimated cost of $25,000,000 or more. Accordingly, a VE analysis will be performed on this project with the aim of improving project quality, reducing project costs, fostering innovation, eliminating unnecessary and costly design elements, and ensuring efficient investments. The results of the analysis and associated recommendations will be considered in the development of the plans, specifications, and estimate.